

OCEAN OPTICS XXIV

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Tuesday, October 9

Poster Session 2

10:30–12:30

Poster 174

IMPACTS OF THE DISTRIBUTIONS OF CYANOBACTERIA POPULATIONS IN LAKE ERIE ON REMOTE SENSING

Freshwater cyanobacteria blooms occur in lake systems throughout the world, and are believed to be increasing in duration and intensity due to a variety of reasons including climate change. The expansion of outbreaks is of concern because of the toxins often associated with cyanobacteria blooms are a health risk to humans and animal life. However, knowledge gaps in optical properties of cyanobacteria impair interpretations of remote sensing products. Further, the eco-physiology of cyanobacteria varies across genera in regards to tolerance to light exposure, which can partly be controlled by buoyancy regulation via gas vesicles. The vertical and horizontal distributions of cyanobacteria are partly a reflection of these light tolerances and/or preferences, and impact the quality of light leaving the water. A detailed study of the distributions of cyanobacteria and their optical properties was conducted in Lake Erie in August 2014 during bloom conditions. Using a combination of optical profiling systems, digital holography and aircraft LIDAR, we observed horizontal variations in two different cyanobacteria populations occupying adjacent and connected water sub-systems within the western basin of Lake Erie. The two populations comprise *Microcystis* and *Planktothrix* dominated genera, and vertical differentiation was observed. Both genera contain gas vesicles, which in addition to buoyancy regulation, increase backscatter properties to the cells and associated colonial aggregates. The difference in vertical structure had a profound effect on the remote sensing reflectance, providing insight into interpreting bio-optical signals. This has broad relevance to lake systems with similar cyanobacteria in the context of remote sensing.

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